CHOMERICS TEST SERVICES

TEST REPORT

for

SIEMENS MEDICAL

COMPANY PRODUCT NAME

SC8000 BIO-TELEMETRY TRANSMITTER

FCC PART 15 SUBPART C CERTIFICATION
RADIATED EMISSIONS ONLY

Submitted to:
Jim Greco
Siemens Medical
16 Electronics Avenue
Danvers, Massachusetts 01923

Prepared by: William Torrence
Date: August 26, 1998
Test Report: TR1774.98
Purchase Order: EN141765
Number of Pages: 15

I attest to the accuracy of the test data in this report:

William Torrence
Technician/Test Engineer

David C. Fanson
Test Services Approved Signatory

Official responsible for marketing this equipment

TEST REPORT
NVLAP Accredited Laboratory

Parker Seals

Chomerics, 77 Dragon Court, Woburn, Massachusetts 01888-4014
(617) 935-4850 FAX: (617) 935-2758

ADMINISTRATIVE DATA

Purpose of Test:	FCC Part 15 Subpart C Certification (Radiated Emissions)
Test Specification:	FCC Part 15 Subpart C (Radiated Emissions)
Manufacturer:	Siemens Medical
Manufacturer's Type or Model Number:	SC8000
Number of Items Tested:	One (1)
Date of Test:	August 24, 1998
Test Observed By:	Jim Greco
Affiliated With:	Siemens Medical
Test Location:	Chomerics Open Area Test Site A
Tests Conducted By:	William Torrence
Condition of Test Equipment Upon Arrival:	Good
Customer's Equipment Returned VIA:	Customer transport

TEST RESULTS

The Siemens SC8000 meets the FCC Part 15 Subpart C radiated emissions limits as configured and operated for testing. The Biotelemetry device was tested to paragraph 15.242 as defined by ET Document No. 95-177 and FCC 97-379.

The transmit mode of operation was used for emissions tests.

The equipment under test was set up as illustrated on CTS-Form-014.

TEST SERVICES FACILITY INFORMATION

Chomerics Test Facility is recognized under the National Voluntary Laboratory Accreditation (NVLAP) Program for NVLAP Codes 12/C01 and 12/R01. Tests within this report not conforming to 12/C01 and 12/R01 NVLAP Codes are not covered under Chomerics NVLAP accreditation.

Chomerics Test Facility operates under the current revision of Chomerics Quality Assurance Manual Document Number QA002.

The QA manual has been constructed to reflect a quality program in accordance with the requirements of the National Institute of Standards and Technology (NIST), ISO 9002, ISO Guide 25, NIST Handbook 150, EN 45001, MIL-I-45208A, MIL-STD-461D, 462D and Chomerics Quality Assurance Program (QAP).

The QA manual outlines and describes the procedures for establishing and maintaining the quality of analysis, research, inspection, and testing within Chomerics Test Service (CTS).

This test report does not represent an endorsement by the U.S. Government.

The results and/or conclusions within this test report refer and/or apply only to the unit(s) tested as defined by this report.

Measurements performed for this test are traceable to the National Institute of Standards and Technology (NIST) based on the fact that all test equipment used for the measurements were previously calibrated using standards traceable to NIST.

No deviations, additions to, or exclusions from the test specification(s) were made.

The system amplitude accuracy for the measurements made during the radiated emission tests was ±3dB.

TEST SITE DESCRIPTIONS

The following is a description of Test Services Open Field Test Sites. Refer to Administrative Data on page 2, line 9 for the specific test site used for testing.

OPEN AREA TEST SITE A: Chomerics open area test site "A" is located in the parking lot behind the Seeger Building at Chomerics, 77 Dragon Court, Woburn, Massachusetts.

The open area test site "A" is a wooden "A" frame, bounded by Dragon Court, a one story brick building, and a paved area. Photographs of the site and site attenuation data are on file with the Federal Communications Commission.

The supporting structure used for support of the equipment under test is a wooden rotatable platform .8 meters high. A similar supporting structure is used for the measuring equipment. The mast supporting the antenna can be adjusted from one to four meters in height.

OPEN AREA TEST SITE B: Chomerics open area test site "B" is located in the lower parking lot behind the Seeger Building at Chomerics, 77 Dragon Court, Woburn, Massachusetts.

Photographs of the site and site attenuation data are on file with the Federal Communications Commission.

Parking is permitted on one side of test site "B" at a discrete distance from the imaginary ellipse.

The open area site B enclosure is a wooden structure measuring 56 X 30 X 25 feet in size with galvanized steel sheet metal used as the ground plane. The structure is sized to allow both 3 and 10 meter measurements and is heated and/or air conditioned.

The structure used to support equipment under test is a 14 foot diameter motorized turntable. The sheet metal surface is flush with the ground plane. To ground the turntable, 175 copper fingers (1" x 1.5") are mounted around the outer edge of the turntable using machine screws. The spring fingers are equally spaced and provide a uniform interface between the turntable metal surface and ground plane. When needed for table top equipment, a wooden table measuring 3 x 6 feet in size is positioned at the center of the turntable, at the proper height above the ground plane.

The addition at the end of the open area test site is the location for the test personnel and equipment to ensure they are outside the imaginary ellipse.

Both Test Site A and B are listed by the Federal Communications Commission (FCC).

RADIATED EQUIPMENT LIST

	Test Equipment	Asset #	Serial #	Cal
	Tektronix 496 Spectrum Analyzer	1	B010559	10/98
X	Tektronix 496 Spectrum Analyzer	77	B020852	1/99
	Tektronix 496 Spectrum Analyzer	56	B010206	4/99
	Tektronix 494 Spectrum Analyzer	543	B010201	9/98
X	Rhode and Schwartz ESV Test Receiver	15	875931049	9/98
	Rhode and Schwartz ESV Test Receiver	521	979531/031	1/99
	Hewlett Packard 8559A Spectrum Analyzer	472	2019A00461	1/99
	Hewlett Packard 182T Analyzer Main Frame	352	1931A003349	1/99
	Hewlett Packard 8447D Pre Amp	12	2944A06414	1/99
X	Hewlett Packard 8447D Pre Amp	4	2727A06065	1/99
	Electro Metrics ALR-25M Loop Antenna	17	4706	1/99
X	EMCO 3120 Tuned Dipole Antenna B1	477	56	1/99
X	EMCO 3121 Tuned Dipole Antenna B2	478	176	1/99
X	EMCO 3121 Tuned Dipole Antenna B3	479	728	1/99
	EMCO 3120 Tuned Dipole Antenna B1	453	42	1/99
	EMCO 3120 Tuned Dipole Antenna B2	454	65	1/99
	EMCO 3121 Tuned Dipole Antenna B3	455	9501-1101	1/99
	EMCO 3120 Tuned Dipole Antenna B1	474	21	1/99
	EMCO 3121 Tuned Dipole Antenna B2	475	177	1/99
	EMCO 3121 Tuned Dipole Antenna B3	476	698	1/99
	EMCO 3115 Microwave Horn Antenna	376	2796	1/99
X	EMCO 3105 Microwave Horn Antenna	78	2118	1/99
	Polarad MDS21 Absorbing Clamp	435	301404/003	NCR

RADIATED EMISSIONS
30 MHz to 1000 MHz

Test No: ONE (1)

Equipment Tested: Siemens SC8000

Configuration: For small devices, the devices are set up on a wooden turntable 3 meters from the tunable dipole antenna.

For larger floor standing devices, the devices are set up on the turntable and electrically isolated from it.

There was no support equipment needed to run the SC8000 in a transmit mode of operation due to the fact that the EUT is a stand alone device.

Any emissions radiating from the SC8000 were maximized by rotating the test table and placing the cables in their worst case configuration.

Test Mode: Transmit

Results: The Siemens SC8000 meets FCC Part 15 Subpart C radiated emissions limits as configured for testing. The fundamental signal was measured at the low, middle and high range of transmitters capability (512, 540 and 566 MHz). A new battery was used for testing.

Fixes: None

CABLE CONFIGURATION

There were no cables that were exiting the equipment under test.

SUMMARY OF RECOMMENDATIONS

The Siemens SC8000 will require no modifications in order to insure compliance with the FCC Part 15 Subpart C radiated emission requirements for digital devices.

Please note that if any modifications and or fixes were implemented to the EUT to achieve compliance, that other approaches to solving the problem may exist. In addition, any EMI/EMC shielding products listed in this report may be substituted with an equivalent.

APPENDIX A

TEST DATA

TEST LOG

Customer: Siemans Program: _____

EUT: SC8000 S/N _____

	DATE	COMMENTS
PRE-TEST CHECKLIST		Test Plan/Procedure: _____ Test Specification: ANSI C63.4 FCC Chomerics Procedure: CHO TPEC.295 T1 EUT Power Requirement Verified: Voltage 9VDC Frequency _____ Phase _____ Voltage _____ Frequency _____ Phase _____ EUT Functional Operational Check: [✓] Pass [ ] Fail Environmental: Ambient Temperature 68 °F Humidity: 45 % Atmospheric Pressure: 30.5 Bonding / Grounding: _____ Safety Issues: _____

IN-PROCESS TEST CHECKLIST

Date	Test Type	Test Equipment Calibrated	Test Performed Properly-Data Accepted	EUT Setup Check / Operational Check	EUT Pass/Fail
7-30-98	Rad Emission	✓	✓	✓	PASS

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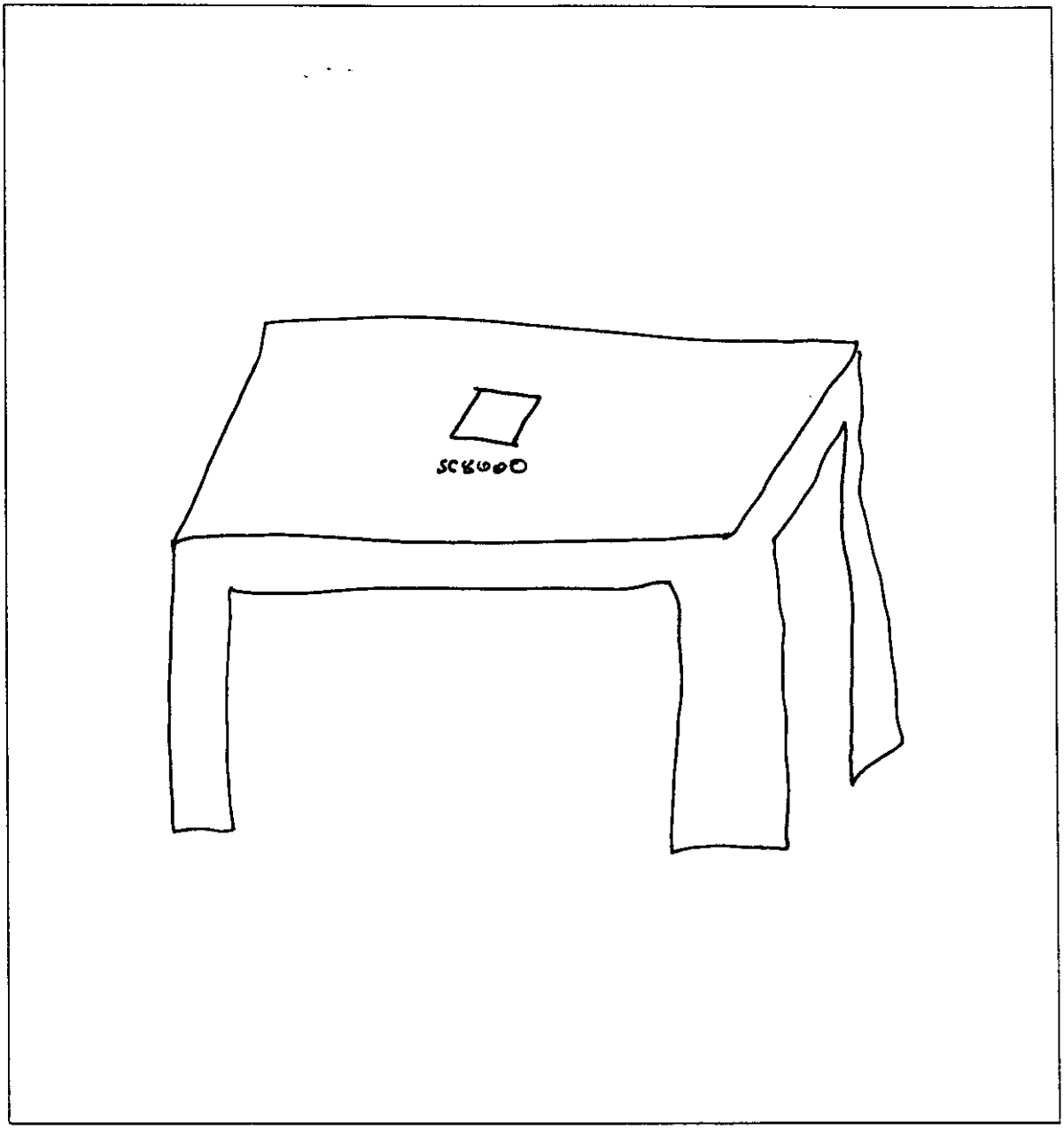
DATE: August 26, 1998

POST TEST CHECKLIST	Date: 7-30-98	EUT Functional Operational Check: [✓] Pass [ ] Fail	William Hammer Test Engineer/Tech	Test Services Mgr

System Configuration Block Diagram- Provide a line drawing identifying the EUT, simulators, support equipment, I/O cables. power cables, and any other pertinent components to be used during testing. Use a dashed line to separate the equipment in the testing field versus equipment outside testing field.



CUSTOMER: Siemans

EUT: SC6000

DATE: 7-30-98

S/N:

RADIATED E FIELD EMISSION MEASUREMENTS

CUSTOMER: Siemans

EQUIPMENT: SC8000

TESTED BY: B. Torrence

BANDWIDTH: [X] 100 kHz (PEAK) / 120 kHz (QP)

OTHER (SPECIFY) _____

FREQUENCY RANGE: [ ] 30MHz - 1GHz

OTHER (SPECIFY) 30 MHz – 5.66 GHz

DATE: 7-30-98

TEST NUMBER: one (1)

OPERATING MODE: Normal

TEST SPEC: ANSI C63.4

PROCEDURE: FCC

ANTENNA DISTANCE: [X] 3 METERS [ ] 10 METERS

unit set for 566 MHz

Frequency MHz	Peak Measured Level -dBm	Quasi-Peak Measured Level dBuV	Antenna Height (Meters)	Turntable Azimuth (Degrees)	Antenna H/V	Antenna Fac/Cable Loss dB	Field Level dB uV/m **	Limit dBuV/m (QP)
566	—	63	1.5	270	H	34.1	97.1	106
1132	—	20	1.0	270	H	26.6	46.6	54
1699	—	17	1.0	0	H	28.56	45.6	54
2264	—	8	1.5	135	H	29.47	37.4	54
			No other Signals Were detected					

** All signals greater than 3dB from the limit are calculated to the nearest whole number.

** Field Level (dBuV/m) = [107 - Measured Level (dBm)] + Antenna Factor/Cable Loss (dB)

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RADIATED E FIELD EMISSION MEASUREMENTS

CUSTOMER: Siemans

DATE: 7-30-98

EQUIPMENT: SC8000

TEST NUMBER: ~~one~~ (1)

TESTED BY: B. Torrence

OPERATING MODE: Normal

BANDWIDTH: [~~9~~] 100 kHz (PEAK) / 120 kHz (QP)

TEST SPEC: ANSI C63.4

OTHER (SPECIFY) _____

PROCEDURE: _____

FREQUENCY RANGE: [ ] 30MHz - 1GHz

ANTENNA DISTANCE: [X] 3 METERS [ ] 10 METERS

OTHER (SPECIFY) 30MHz

	Frequency MHz	Peak Measured Level -dBm	Quasi-Peak Measured Level dBuV	Antenna Height (Meters)	Turntable Azimuth (Degrees)	Antenna H/V	Antenna Fac/Cable Loss dB	Field Level dB uV/m **	Limit dBuV/m (QP)
Fund.	512	—	59	1.5	276	H	32.1	91.1	106
Fund.	540	—	56	1.5	249	H	33.1	89.1	106
Fund.	566	—	56	1.5	198	H	34.1	90.1	106
				Fundamental Signal					

** All signals greater than 3dB from the limit are calculated to the nearest whole number.

** Field Level (dBuV/m) = [107 - Measured Level (dBm)] + Antenna Factor/Cable Loss (dB)

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APPENDIX B

SETUP PHOTOGRAPHS